

Subscale Unmanned Systems Integration Effort (SUSIE)

Thrust Augmented Control Demonstrator

Challenge

- Subsonic Single Aft eNginE (SUSAN) Electrofan addresses barriers to electric aircraft design and certification
 - Single-aisle class aircraft
 - Target 50% reduction in flight emissions
- Subscale research vehicles required to demonstrate and mature concepts and technologies

Expected Impacts

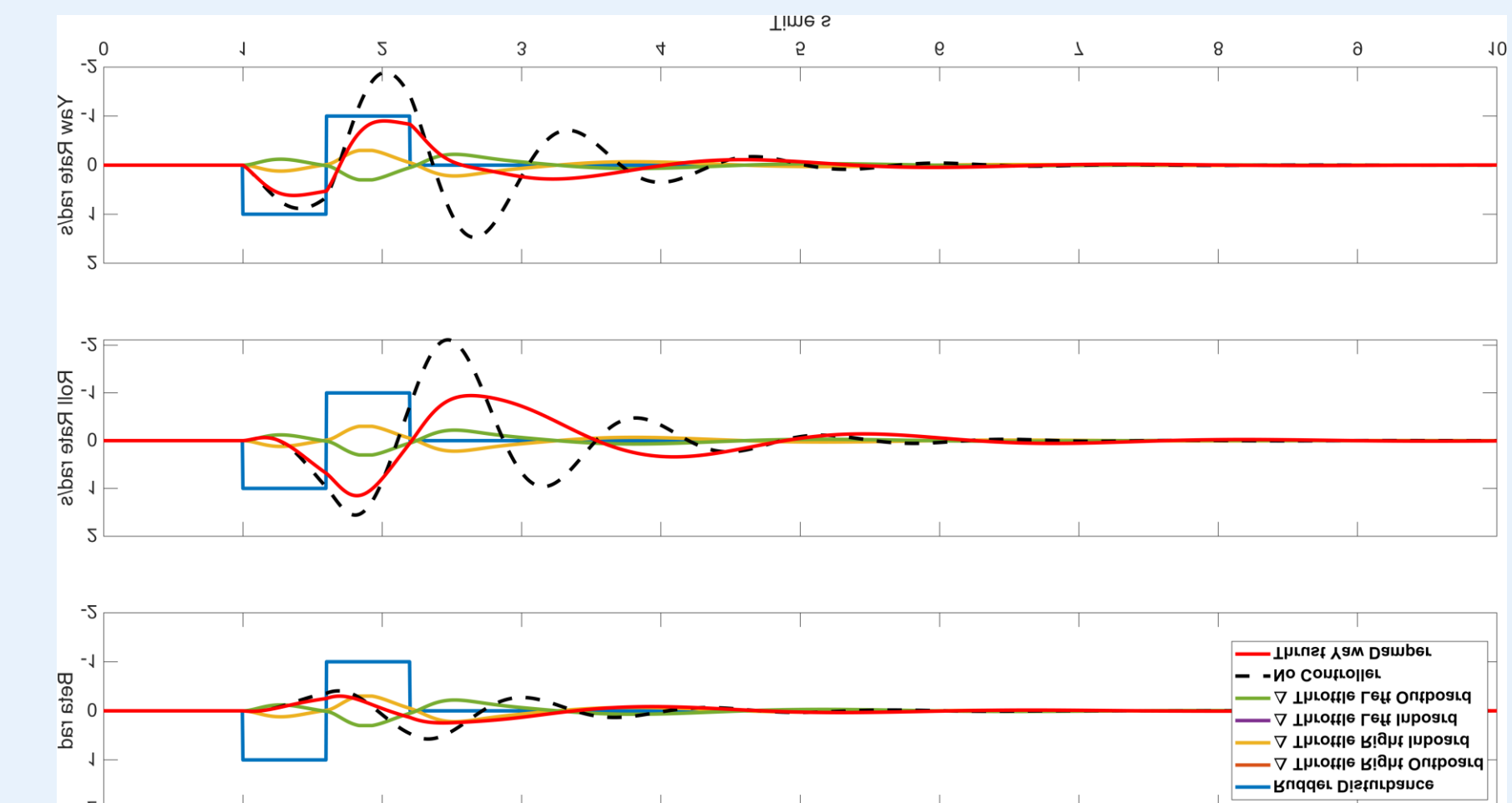
- Support development of larger-scale SUSAN concepts
- Demonstration of thrust-augmented flight controls at small scale
- Development of method for integrated flight-power-propulsion control architecture
- Integration of concepts into commercial aircraft will reduce emissions

Solution (or Proposed Solution)

- Small-scale, lightweight, inexpensive test bed
 - Controls development
 - Tail size evaluation
 - Risk reduction
 - Supports technology maturation
- Method for control law development for highly-integrated systems

Results

- Modeled lateral-directional dynamics and their change with tail size from flight data.
- Developed controller that demonstrates feasibility of thrust based yaw control to dampen Dutch Roll mode of the aircraft in simulation



Next Steps

- Demonstrate degree of controllability and control augmented aircraft stability in flight.
- Implement thrust based yaw control to larger scale aircraft including 25% and full-scale SUSAN

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SUSAN concept aircraft



SUSIE in flight at Armstrong Flight Research Center



SUSIE taking off



SUSIE – engine layout and tail size study